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PHYSICS IN TECHNICAL COLLEGES

VI — THE POLYTECHNIC, REGENT STREET, LONDON

By J. TOPPING, M.Sc., Ph.D., D.I.C., F.Inst.P.

The Polytechnic took its name from the premises in Regent Street acquired in 1881 by Quintin Hogg, its founder, to house his club for young working men. The Institute, as it was called, with its religious, social and athletic activities continues to this day and the educational work which started as evening classes for mechanics and artisans has so developed as now to include a Grammar School, of which the present Headmaster is Dr. B. L. Worsnop, F.Inst.P., and a senior Technical College with over 2600 day students and more than 10,700 evening students.

Mathematics and Physics must have been taught in the Polytechnic from its earliest days, but the Department in its present form goes back only to 1919. It is a joint department responsible for the teaching of mathematics and physics throughout the Polytechnic. Before 1919 a separate Mathematics Department had existed as well as a combined Department of Physics and Electrical Engineering. The latter, as far back as 1902, was housed in the main building having one laboratory and one lecture room. Its Head was Mr. W. Hibbert, known to physicists as responsible for the Hibbert balance, but remembered by the older generation of Polytechnic members for his delightful lectures on popular science.

DAY CLASSES

Since 1919 many changes have inevitably taken place, but some have been accelerated by the second world war and the Education Act of 1944. Whereas earlier the Department's function was to cater for students in almost every other department whose studies included mathematics and physics, now the Department has in addition a considerable body of students of its own. This session some 430 students from other departments of the Polytechnic attend classes in mathematics and physics, whilst the Department has about 90 full-time day students in the Intermediate Science and degree courses.

The day students who stay on after Intermediate to be trained in physics are, *faute de mieux*, prepared for the general and special degree examinations of the University of London. They follow a normal academic course with, as perhaps is to be expected in a Technical College, some training in workshop practice and glassworking. A different type of course including, in the final year at least, some branches of applied physics is planned to be developed as opportunity arises. The numbers of students in the degree courses have risen steeply since the war, but it seems likely that they will now fall perhaps sharply. This session there are 39 students in the B.Sc. Physics course, 18 of them in the final year. Last year five full-time students were successful in the special degree and eleven in the general degree examinations. Over the past five years the total numbers have been forty and fifty-two respectively.

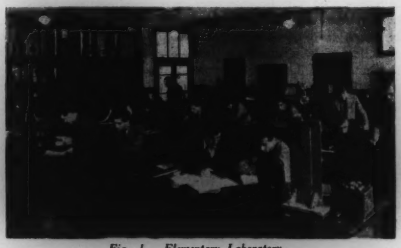

Fig. 1. Elementary Laboratory.

EVENING CLASSES

Technical colleges attract as well as day students large numbers of evening students. Sydney Webb could write, as long ago as 1904, " London has not only a decentralised but also an ' evening class ' University of the most popular kind."

Fig. 2. Advanced Laboratory.

However that may be, it is true to-day that many in full-time employment as research assistants, engineers, technicians, teachers, civil servants and the like attend evening classes. Numbers of them attend for many years and some are successful in obtaining a University degree ; their industry and single-mindedness are much to be admired. Not a few who have come up " the hard way " are amongst the foremost in their profession.

The Department has to cater for more than a thousand evening students from other Departments, as well as for over four hundred students of its own. The latter include those attending Intermediate and degree classes, besides those taking post-graduate and other special courses. Numbers of graduates in science and engineering seem to welcome post-graduate courses in special branches of physics in which there have been outstanding recent advances, whilst others seem to require courses in theoretical physics or in certain mathematical techniques, e.g., mathematical statistics, tensors, Laplace transforms, numerical analysis, Bessel and other special functions, which presumably they need in their work. This promises to become an important function of some of the larger Technical Colleges ; it is however, partly fulfilled by some of the special conferences and courses arranged by the Institute of Physics and the Universities. The Department has played some part in organizing special courses in rheology and a Summer School in that subject was arranged a few years ago. Other recent courses have been in the field of electronics.

ACCOMMODATION AND EQUIPMENT

The Department has five laboratories, a small optics room, two small research rooms and a workshop. These are tended by a senior laboratory technician, a mechanic and five other laboratory technicians. The accommodation is inadequate for all the work undertaken, but the equipment is good and up-to-date, money having been made available on a generous scale. Further developments in applied physics, appropriate to higher technological education, will not be possible until other laboratories are available.

RESEARCH

The limitations of laboratory space also seriously restrict the possibilities of research work in physics, and staff interested in research do such work under real difficulties. There is, however, usually one full-time research student each year and recently a Research Assistant was appointed—one of the twenty which the London County Council has allocated to the London Polytechnics. One or two of the students graduating each year wish to stay on to do research, and there is also a continuous demand from graduates in industry who wish to undertake research as part-time students, but few of these can be accommodated. Research students are normally advised, as a first step at least, to present a thesis for the M.Sc. degree of the University of London and so far four full-time students, working with Mr. J. Yarwood, and two part-time students, working with Dr. J. Topping, have obtained the M.Sc. degree in physics by research.

It is worthy of mention that a few students trained in the Department have proceeded to do research in a University Department of Physics and have acquitted themselves well. This link with the Universities is valuable and much appreciated. One may hope that in the future the traffic may become two-way, but before that is achieved much remains to be done.

Generally, it might be added that although Circular 94 published by the Ministry of Education in 1946 made research in Technical Colleges more easily possible, no real advance is likely until research laboratories are available on a more generous scale. At present research must be concerned with problems requiring little space and limited equipment, and the large team research so characteristic of to-day is quite impossible. But however little is achieved the research activity cannot help but give the physics departments of technical colleges a new spirit and a new life.

NOTICES TO MEMBERS

Salary Statistics

There has been a very good response from Fellows, Associates and Graduates to the invitation to supply data relating to their salaries and other emoluments. About two thousand cards have been returned and the information is being analysed with the intention of publishing a report similar to that published in 1951. It is hoped that the report will appear in the *Bulletin* before the end of the year.

List of Meetings

A half-yearly list of all Institute meetings will be circulated to members of all grades during September. Members may obtain additional copies on application.

The Journal of Scientific Instruments

There has been a gradually increasing delay in publication of papers submitted to the *Journal of Scientific Instruments*, The Board has agreed to an expansion of this Journal for the remainder of this year and each monthly issue will therefore consist of 48 pages of text. The size of the Journal in 1954 will be decided by the Board later in the year in the light of recommendations by the Finance Committee.

No expansion of the *British Journal of Applied Physics* is contemplated this year but there will be a supplement to this volume containing the proceedings of the Conference on Static Electrification are published.

The Journal of Photographic Science

To coincide with the centenary of The Royal Photographic Society, which falls this year, the Society has commenced publication of the *Journal of Photographic Science*, being Section B of *The Photographic Journal*. The journal is devoted to the science and applications of photography and appears bi-monthly on the first day of February, April, June, August, October and December. The subscription rate is £1 5s. 0d. per annum, post free. Further particulars may be obtained from the Publications Manager, The Royal Photographic Society, 16 Princes Gate, London, S.W.7.

Conference on Applied Mass Spectrometry

A conference on applied mass spectrometry organized by the Mass Spectrometry Panel of the Institute of Petroleum Hydrocarbon Research Group is to be held in London on Thursday and Friday, 29 and 30 October, 1953, at the Institution of Electrical Engineers, Savoy Place, London.

In all there will be eighteen papers, the subjects of which will cover quantitative analysis of gases, liquids and solids including the continuous monitoring and control of product composition by mass spectrometry; applications to the study of molecular structure, free radicals and electron/molecule collision processes; recent developments in instrumentation and computing techniques.

The registration fee is £2 2s. 0d. Applications for further particulars and for registration forms should be made as soon as possible to W. J. Brown, Esq., c/o Metropolitan-Vickers Electrical Co. Ltd., Trafford Park, Manchester 17.

APPOINTMENTS VACANT

The inclusion of particulars of a vacancy must not be taken to imply that the Institute necessarily approves of the terms offered or that might be offered. Candidates should satisfy themselves that these are satisfactory, and they may always refer to the Institute for advice.

University College of North Staffordshire. Technicians: Applications from candidates aged 20 or over. Practical experience in electronics or instrument repair an advantage. Appointment as **Junior Technician** (£234 at age 20 × 26 to £312) or **Technician** (£315 × 15 — £390 × £450) according to age, qualifications and experience. Superannuation scheme. Applications, with full details of education and experience and with the names of two referees, should be sent as soon as possible to the Professor of Physics, University College, Keele, Staffordshire, from whom further particulars may be obtained.

Ministry of Supply Research Establishment, S.E. London, requires **physicist** to assist in work involving application of electron microscopy to explosives and metallurgical problems. Qualifications :— Higher School Certificate (Science) or equivalent, but higher qualifications, e.g. degree, may be an advantage. Previous experience in electron microscopy not essential but experience involving advanced metallographic techniques required and knowledge of high vacuum techniques required and knowledge of high vacuum techniques and electronics an advantage. Salary within range, Experimental Officer (min. age 26), £681–£838. Women somewhat less. Post unestablished. Application forms from M.L.N.S., Technical and Scientific Register (K), 26 King Street, London, S.W.1, quoting A93/53/A. Closing date September 24, 1953.

A **physics** or **engineering graduate** with a knowledge of electronics is required by the Research Laboratories of **The General Electric Co. Ltd., North Wembley, Middx.,** for work in connection with under water acoustics. Apply in writing to Staff Manager (Ref. RLO/606), giving full particulars of age, qualifications and experience.

Ministry of Supply require **Engineer, Physicist** or **Mathematician** at Research Branch, Tolworth, Surbiton, to work in small team engaged in design and development of wide range of survey, photographic and printing equipment. Work includes interpretation of requirements in terms of practical design and development, initial preparation of design specifications, guidance and supervision of development projects at contractors' works, and completion of specifications

and drawings for production. Qualifications : 1st or 2nd class honours degree or equivalent qualification in Engineering, Physics or Mathematics, with at least three years relevant post-graduate research experience. Specialised knowledge in at least one of the above fields required, administrative experience desirable. Salary within range, Senior Scientific Officer (min. age 26), £812—£1,022. Women somewhat less. Post unestablished. F.S.S.U. benefits may be available. Application forms from M.L.N.S., Technical and Scientific Register (K), 26 King Street, London, S.W.1, quoting A194/53/A. Closing date September 24, 1953.

Chief Engineer required by the Armament Division of the **Fairey Aviation Co. Ltd.,** in Australia. The successful applicant will be required to organise and lead a team of Technicians in Armament Development work with special emphasis on the development of Guided Missiles. He should have an extensive Electronic Engineering background. Salary according to experience and qualifications. Arrangements will be made for transport to Australia. Assistance will be given in locating suitable accommodation upon arrival in South Australia. Apply in writing giving full details of experience, etc., to the Personnel Manager, The Fairey Aviation Co. Ltd., Hayes, Middx., quoting reference RDA/1.

Bakelite Limited require a **physicist** to take charge of the physical laboratories of the Research and Development Department in which the properties of plastics and the physical aspects of manufacturing processes are investigated. Candidates should be about 30 years of age and have a 1st or 2nd class Honours degree in physics. At least five years experience in an industrial or other research laboratory is essential. This position offers an excellent opportunity to a man with a more than average capacity for original thought. A Pension Scheme is in operation. Applications should be addressed to Research and Development Director, Bakelite Limited, Redfern Road, Tyseley, Birmingham 11.

Electrical or Electronics Engineer with degree or Higher National Certificate in Engineering required by Dunlop Research Centre to carry out work on the application of automatic control and servo devices to production processes. Age 24-30. Applications in writing, quoting reference J.M. 19 and giving details of age, qualification and experience to Personnel Manager, **Dunlop Rubber Co. Ltd.,** Fort Dunlop, Birmingham 24.

Physicist with good honours degree required by **Dunlop Research Centre** to carry out work on general physics problems related to the rubber industry. The position should lead eventually to the supervision of a small group of research workers. A knowledge of electronics is an advantage, but not essential. Age 27-35. Applications in writing, quoting reference J.M. 18, and giving details of age, qualifications and experience to Personnel Manager, Dunlop Rubber Co. Ltd., Fort Dunlop, Birmingham 24.

Physicist or Electrical Engineer required to assist the Technical Manager of a medium-sized company engaged in the manufacture of rubber and thermoplastic insulated cables. Duties will include technical control of production and developments of the Company's products. Applicants should be graduates in physics or electrical engineering, or possess equivalent qualifications. Preferred age 20-30 years. Write giving full details and salary required to: Manager, Cable Division, **St. Helens Cable and Rubber Co. Ltd.,** Slough, Bucks.

London Brick Co. Ltd., requires at Stewartby, near Bedford, a young scientist, graduate or equivalent, initially to investigate the flow of gases in chambers and ducts, using model techniques. Previous experience of this type of work not essential. Apply giving full particulars of qualification and experience to: The Personnel Manager, London Brick Co. Ltd., Stewartby, near Bedford, Beds.

Technical Sales Representative required to handle Nucleaonic instruments and other scientific apparatus. Excellent opportunity for radio-chemist with own car. Send full details to Box No. A.V. 43, The Institute of Physics, 47 Belgrave Square, London S.W.1.

Physicist required to control the physics section of a research and development laboratory. Applicant would be required to work with chemists, metallurgists and ceramists in developing a variety of semi-conductors, ferroelectric and ferromagnetic materials for the electronic, radio and radar industries. Measurements of the basic properties of these materials would be an important part of the work. Applicants should have either an honours degree in physics with a minimum of 3 years' experience, or a Ph.D. Salary will depend on experience and qualifications. Apply Box A.V. 46, The Institute of Physics, 47 Belgrave Square, London S.W.1.

Electronic Engineer or Physicist to join a research group engaged in the development of a variety of metallic and ceramic materials for the electronic, radio and radar industries. Applicant would be concerned with establishing practical applications for these materials and would be required to carry out measurements and tests to accumulate the necessary data. Starting salary about £650 depending on age, qualifications and experience. Box No. A.V.44, The Institute of Physics, 47 Belgrave Square, London S.W.1.

COURSES

SIR JOHN CASS COLLEGE

Jewry Street, Aldgate, E.C.3

Full-time and part-time courses for the Internal B.Sc. (Special) degree in Physics and the B.Sc. (General) degree of the University of London and for the Graduateship Examination of the Institute of Physics open on September 28. Facilities also exist for post-graduate work leading to higher degrees.

Prospectus and Application form may be obtained from the Principal.

BOROUGH POLYTECHNIC

Borough Road, S.E.1

Crystal Valves and Transistors

A course of six lectures will be given on Tuesday evenings, 7–9 p.m., commencing Tuesday, October 20, 1953.
Fee for the course £1 10s. 0d.

Fundamental principles of pulse techniques

A course of sixteen lectures will be held on Monday evenings, 7–9 p.m., commencing Monday, October 26, 1953.
Fee for the course £3 0s. 0d.
For further particulars apply to the Secretary.

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